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POPULATION PROJECTION FOR ETHIOPIA, 1985-2000,
AND REVIEW OF PAST EXPERIENCES

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I. INTRODUCTION

A - Uses of Population Projection

It is common practice nowadays that every Government plan its society's development through systematic and institutionalized short, medium and long term economic and social development plans. The economic and social development plans require comprehensive population projection to plan and set targets of the various sectors of the economy and to monitor the implementation of the development plans. Hence the preparation of timely and comprehensive population projections is necessary and should be taken as an important function by institutions concerned.

B. Population size, distribution and average household size

The sources of demographic data in the country have been the two rounds of National Sample Surveys, 1964-1967, and 1968-1971, respectively, the 1979/80 and 1980/81 rural demographic surveys and the 1978 manpower and housing survey conducted in 18 major urban areas. Because these surveys in common lack detailed demographic data at the regional and lower administrative levels as well as complete geographical coverage, the lack of adequate and reliable data has been a major problem. Fortunately, the successful completion of the first population and housing census in May 1984 will go a long way in satisfying the data needs of the country.

We will here briefly present the population size, distribution and other parameters obtained from the preliminary census results. The census covered about 85 per cent of the rural population and almost all urban. It excluded the rural population of Eritrea and Tigray regions, Asseb Administration, the nomadic Ogaden awrajas of Hararge, Elkere awraja in Bale, parts of Wollo and Gondar regions. The census results plus the official estimates for non-covered areas plus the official estimates for non-covered areas put the May 1984 population of the country at 42,169,203, of which the urban population was 4,454,815 or 10.56 per cent. The sex ratio was 87 for urban, 101 for rural and 99 for the total population. The average household size was 4.4. The population density was 34.5. The reported crude birth rate was 41.4 for rural, 27 for urban, and 39.5 for total population and the reported crude death rate was 13.2 for rural, 8 for urban and 12.5 for total population. The crude rate of natural increase was 2.82 per cent for rural, 1.90 for urban and 2.70 for total population.

Table 1 presents distribution of population, per cent urban, area, density and average household size by regions. It will be observed that the regional population distribution is uneven. Shewa, the most populous region, accounted for slightly less than one-fifth of the total population, and the five most populous regions with a population of 3 million or more accounted for 54.4 per cent of the total population. On the contrary, the three least populous regions with a population of about 1 million accounted for only 7.6 per cent. The population density ranged from as low as 7.8 persons in Bale to as high as 94.8 persons in Shewa. The most densely populated regions were Shewa, Arssi, Gojjam, Keffa, Wollo and Gondar. Bale, Illubabor and Hararge were less densely populated. The great unevenness in population distribution becomes more evident when viewed in

light of the fact that rural awraja (province) population densities vary from as low as less than five persons per km² in the lowland areas to as high as close to 300 persons in the most populous awrajas of the country (280 in Kembata and Hadiya, 275 in Wollayta).

As can be seen from Table 1, the degree of urbanization in the country is very low, and the proportion urban accounted for 10.6 per cent. The per cent urban vary from about 5 per cent in Keffa, Wellega, Gamogoffa and Illubabor to as high as 15 per cent in Eritrea. Although for the purpose of the census 660 localities were counted as urban, only 339 urban areas had a population of 2000 and over, which is the definition taken here. Although the degree of urbanization is very low, the rate of urban population growth has been very fast, 4.8 per cent per annum.

II. Review of Population Projections in Use up to now

Excepting the wild population estimates by travellers and Italian sources that prevailed up to 1950's ^{1/} the earliest available population estimates of the country that had some factual basis dates back to 1956 which was based on the population reporting conducted by the Ministry of Interior in 1956 for the purpose of determining the number of constituencies and election of representatives to the chamber of deputies of the first parliamentary election in 1957. The reporting covered 87 per cent of the total population, and the remaining 13 per cent were estimated independently. The population of Ethiopia was estimated at 19.5 million in 1956. Population estimates by regions and size-class of municipalities based on the 1956 population reporting for rural areas, and 1956 and 1962 for municipal towns, conducted by the Ministry of Interior, first appeared in the 1964 Statistical Abstract, the second issue in the series. The 1962 estimated population was 21,461.7 thousands. ^{2/}

In Ethiopia population projections were available following the launching of subsequent national sample surveys and demographic surveys after the establishment of the Central Statistical Office in the early 1960's. Thus starting around 1970 various population projections of varying detail are available. These will be discussed in turn.

^{1/} See Mesfin W. Mariam, "An Estimate of the Population of Ethiopia", pp. 135-136, in ETHIOPIAN OBSERVER, Volume 5, No. w, 1961, Addis Ababa.

^{2/} Central Statistical Office, 1964 Statistical Abstract, pp. xi, 1-2, Addis Ababa.

Table 1: Distribution of total, urban population, area, density, and average household size by regions, May 1984.

Region	Total Population		Per cent ^{1/} Urban	Area ^{2/}		Density	Household Size ^{1/}
	Number	%		Km (000's)	%		
Arssi	1,662,233	3.94	7.06	24.6	2.01	67.6	4.8
Bale	1,006,491	2.39	6.86	126.3	10.49	7.8	4.7
Gamogoffa	1,248,034	2.96	5.05	40.1	3.28	31.1	4.3
Gojjam	3,244,882	7.69	7.19	64.4	5.26	50.4	4.3
Gondar	2,905,362	6.89	7.10	73.4	6.00	39.6	4.4
Eritrea	2,614,700	6.20	15.30	91.6	7.49	28.5	4.5
Hararge	4,161,168	9.87	7.15	254.8	20.84	16.3	4.3
Illubabor	963,955	2.29	5.27	50.8	4.15	19.0	4.1
Keffa	2,450,369	5.81	4.94	53.0	4.33	46.2	4.1
Shewa	8,090,565	19.19	8.17	85.3	6.97	94.8	4.4
Sidamo	3,790,578	8.99	6.02	116.7	9.54	32.5	4.4
Tigray	2,409,700	5.71	8.21	65.7	5.37	36.7	4.3
Wellega	2,477,277	5.87	4.73	69.8	5.70	35.5	4.7
Wello	3,642,014	8.64	6.83	79.0	6.46	46.1	4.1
Asseb Adm.	89,300	0.21	34.76	25.8	2.11	3.5	3.0
Addis Ababa	1,412,575	3.35	100.0	.2	0.0	5,886	5.2
Total	42,169,203	100.0	10.56	1,223.5	100.0	34.5	4.4

Source: ETHIOPIA 1984 Population and Housing Census Preliminary Report, Volume I, No. 1, Addis Ababa, September 1984.

- a) Urban areas with population 2000 and over are compiled from the census preliminary report.
- b) The average household size for Eritrea, Tigray and Asseb Administration refers to urban population only. The average household size for the City of Addis Ababa is on the high side because the institutional population is not excluded from the total population.

A. Population Projection 1967-1980

On the basis of the results of the National Sample Survey, First Round, 1964-1967 which covered 83 per cent of the rural areas in twelve surveyed regions (excluding Eritrea and Bale), and 92 per cent of urban areas, a provisional projection for 1967-1980's was made. In January 1967, the total population of the country was estimated at 22,591 thousand of which 20,674 thousand were rural, and 1,917 thousand or 8.5 per cent were urban population. Population estimates for the rural and urban areas that were not covered in the survey were based on the 1956 and 1962 Ministry of Interior population reporting that were not reliable. As a relatively larger rural than urban population was estimated from an unreliable source, the estimated rural population was considered as biased.

The projection was based on the following assumptions:

- a) The rural and urban population growth rates were assumed at 2.1, and 6.5 per cent per annum, respectively and assumed constant for the projection period.
- b) That the population growth rate will continuously increase during the decade, and as a consequence of assumption (a) the population growth rate will increase from 2.47 per cent in 1967 to 2.69 per cent in 1980.

This early provisional mathematical projection was only made to project the total population size by rural, urban breakdown.

Accordingly the population size of the country rose from 22,591,000 in 1967 to 31,434,000 in 1980 and the proportion urban increased from 8.5 per cent in 1967 to 13.8 per cent in 1980. ^{1/} This projection was definitely of limited utility.

B. Population Projection 1970-2000

The first detailed population projection by age and sex using the component method of projection was made for the period 1970-2000 as published in "The Demography of Ethiopia". ^{2/}

The population projection constituted one chapter of the above mentioned Statistical Bulletin and the making of the projection was treated in detail. The base rural population estimate was based on the results of the National Sample Survey, Second Round, 1968-1971. For rural areas that were not covered

^{1/} Central Statistical Office, The Population of Ethiopia, pp. 5-14, STATISTICAL Bulletin 6, Addis Ababa, November 1971.

^{2/} Central Statistical Office, The Demography of Ethiopia, Addis Ababa, January 1974.

in the survey, population estimates were based by up dating results of National Sample Survey, First Round or from the 1956 Ministry of Interior population reporting if areas were not covered by either surveys. The urban population estimate for 1970 was arrived by up dating the results of the urban survey, First Round, 1964-1967. The estimated January 1970 base population was 24,068,800 of which 2,337,900 or 9.7 per cent was urban population.

1 - Base Age-Sex Structure

The reported age-sex structure was heavily distorted and thus an adjusted age distribution based on stable population technique was used instead.

2 - Fertility, Mortality and Migration Assumptions

2.1 Fertility

The reported crude birth rate of 38.2 per 1000 was adjusted to 44.7 per 1000. To eliminate the bias due to effects of the age-sex distribution a corresponding age-sex adjusted birth rate of 48 was derived.

2.1.1 Assumptions

Three fertility assumptions were made. For the high fertility variant, no decline was assumed till the end of the projection period. For lack of past fertility data that serves as a basis of future projections, the United Nations generalized pattern of fertility decline has been adopted. The onset of the decline for the low and medium fertility assumptions were taken to start in 1985-1990, and 1990-1995, respectively. Sex ratio at birth was assumed as 105.

2.2 Mortality

The base mortality estimate for 1970 was an e_0^o of 45 years for males, and 40 years for females. Different trends of mortality decline by sex were assumed. Male life expectancy was assumed to follow the UN generalized mortality assumption for developing countries of half a year per year gain in life expectancy. Female life expectancy was assumed to increase at half a year per year from 1970 to 1985, at one year per year up to 1995, and at half a year per year thereafter.

2.3 Migration

There was no information available on international migration, but it was considered insignificant for the purpose of the projection.

3. Results

The population size of the country which was 24,338,600 in 1970 would reach 54,614,300 according to medium variant and 55,804,300 according to the high variant by year 2000. The projection results by sex for the period 1970-2000 are presented in Table 2.

Table 2: Population Projection of Ethiopia, 1970-2000

Year and Variant		Population (000's)		
		Males	Females	Total
1970		12,349.1	11,989.5	24,338.6
1975		14,014.6	13,377.3	27,391.9
1980		15,684.6	15,380.7	31,065.3
1985		17,956.4	17,659.4	35,615.8
1990	High	20,703.5	20,419.9	41,123.4
	Medium	20,703.5	20,419.9	41,123.4
	Low	20,625.3	20,152.3	40,777.6
1995	High	23,882.5	23,861.2	47,743.7
	Medium	23,769.8	23,753.7	47,523.5
	Low	23,391.7	23,141.1	46,532.8
2000	High	28,096.1	27,708.2	55,804.3
	Medium	27,497.0	27,117.3	54,614.3
	Low	26,374.1	26,242.0	52,616.1

N.B. The population projection which was originally given for January of each year were adjusted to July 1, of each year to give mid year estimates in order to maintain comparability.

Source: The Demography of Ethiopia, op. cit., p. 111, and Ethiopia Statistical Abstract, 1982, p. 49.

4. Shortcomings

The projection that was made only gives total population projection by five year age-sex groups. There were no regional, rural/urban, subnational and city population projections made. Despite the fact that the projection did not give rural/urban breakdown, and regional population projections, the CSO was providing total, urban, and rural population estimates by five year age-sex groups, regional population estimates, and population estimates of towns with population of 2000 and over in its annual issues of Statistical Abstracts. The regional population estimates were obtained by assuming constant the ratio of each regions population observed in the base period. The population estimate of each town was obtained by applying a constant urban growth rate of 6.6 per cent per annum, and the urban population was arrived by adding the population estimates of individual towns. The rural population estimate was obtained by subtracting the urban population from the total population.

C. Growing demand for regional and subnational population projections and detailed population data.

The lack of reliable and adequate population data at the national, regional, awraja (province), and at wereda (district) levels have been a major bottleneck in planning. There has been an ever growing demand and awareness by planners, ministries, development agencies and data users for the Central Statistical Office to provide them with detailed demographic data up to the lowest level of administration and have always utilized what ever meagre and deficient data that have been supplied to them. It is expected that most of the demand for detailed demographic data will be met as the results of the May 1984 census become available.

As the National Revolutionary Development Campaign and Central Planning Supreme Council (now Office of the National Committee for Central Planning) was instituted and established in October 1979. CSO prepared annual population estimates by interpolating the five year projections already made for 1970-2000. The urban population estimates were obtained from the total population estimate by multiplying it by the proportion of urban population for the given year. The proportion of urban population which was estimated at 12.8 per cent in 1978 were assumed to increase by 0.4 per cent per annum. Thus the proportion urban would grow from 13.6 per cent in 1980 to 17.6 per cent in 1990.

The more comprehensive and effective demand and integration of population factors into development planning came with the drafting of the ten year perspective plan (1984-1994), the drafting of which started in 1982. Different task forces, about 20, were set up to prepare the draft plans of the various sectors of the whole plan. One of the task forces established was the Statistical Task Force which prepared the plan for the statistical needs, programs and activities for the plan. One of the functions of the Statistical Task Force was to prepare population projections that should serve as a basis for planning and monitoring of the plan. In order that the plan be based on a reliable and realistic population data, CSO initially prepared population projection based on new evidences obtained from the 1979, and 1980/81 Demographic Surveys, and Census Cartographic work and advised that it should be used as a basis for the plan. This new population projection which gave results close to that of the census was not accepted on the

grounds that the census was in hand and CSO was asked to prepare a population projection based on the old estimates. Then CSO prepared annual population estimates for total, urban, and rural by age and sex for 1980-1995 covering the plan period based on the 1970-2000 projection. Regional Population estimates were also prepared by sex. All the sectors of the plan, macro-economic, food, health, education, manpower, social services, housing, agriculture, industry, trade, etc. used the population projection to plan their sectors and to set targets. The population projection for 1980-1995 used for the plan is given in Table 3. However, it suffices to say that the census results clearly demonstrated that the plan was based on a low population figure.

III. New Population Projection: 1985-2000

The results from the population and housing census which covered about 85 per cent of the country plus the estimates taken for the areas not covered in the census put the 1984 population of the country at 42,169,203. This result greatly exceeded by 22 per cent the 1984 official population estimate of 34.6 million. The Central Statistical Office is in the process of preparing population projections based on the census result for revising the ten year perspective plan which as already stated was based on a smaller population.

In this paper, a population projection based on the census result will be made for the period 1985-2000. Since this is a first attempt to prepare population projection based on the census result, it will serve as a useful basis for the population projection that will be prepared by the Central Statistical Office.

As detailed census data from the second stage of data processing and publication which encompasses all urban population, and 20 per cent of rural enumeration areas are not yet available, only the population size by sex obtained from the preliminary result is utilized here. The rest of the basic data were derived from the 1978 Manpower and Housing Survey and the 1980/81 Demographic Survey.

1. Age-Sex Structure

The age-sex structure of 18 major urban areas, and the 1980/81 Demographic Survey were adjusted and weighted to give the country's age-sex structure. The reported age distribution was heavily distorted due to age-misreporting, and under-reporting of children aged 0-4 especially males. The common feature of the reported age distribution was a large over-reporting and excess of females over males in the age group 20-34 years and male excess over females in the age-group 5-19, and at 35 years and over. In the urban areas females exceed males except in the age group 0-9 years. The large excess and over-reporting of females in the age group 20-34 should mainly be due to large female age understatement in the reproductive ages which led to rapid thinning out of females at ages 45 and over. Sex ratios has been constant for a long time, 104 for rural, 86 for urban, and 102 for the country. The census preliminary result gave the same sex ratio for urban, 87, but lower sex ratio for rural, 101 and 99 for total population. The low sex ratio revealed by the census need to be evaluated when detailed census data become available.

Table 3: Rural, urban and total population projection by sex,
1980-1995 (in 000's)

Year	Sex	Population		
		Rural	Urban	Total
1980	Male	13,683.3	2,001.3	15,684.6
	Female	13,157.1	2,223.6	15,380.7
	Total	26,840.4	4,224.9	31,065.3
1981	Male	13,987.7	2,115.8	16,103.5
	Female	13,449.7	2,350.9	15,800.6
	Total	27,437.4	4,466.7	31,904.1
1982	Male	14,302.8	2,235.6	16,538.4
	Female	13,752.6	2,484.0	16,236.6
	Total	28,055.4	4,719.6	32,775.0
1983	Male	14,628.8	2,361.1	16,989.9
	Female	14,066.2	2,623.5	16,689.7
	Total	28,695.0	4,984.6	33,679.6
1984	Male	14,967.8	2,492.8	17,460.6
	Female	14,392.2	2,769.8	17,162.0
	Total	29,360.0	5,262.6	34,622.6
1985	Male	15,324.6	2,631.8	17,956.4
	Female	14,735.1	2,924.3	17,659.4
	Total	30,059.7	5,556.1	35,615.8
1986	Male	15,691.2	2,777.0	18,468.2
	Female	15,087.7	3,085.6	18,173.3
	Total	30,778.9	5,862.6	36,641.5
1987	Male	16,069.3	2,929.0	18,998.3
	Female	15,451.3	3,254.5	18,705.8
	Total	31,520.6	6,183.5	37,704.1
1988	Male	16,459.4	3,088.1	19,547.5
	Female	15,826.4	3,431.2	19,257.6
	Total	32,285.8	6,519.3	38,805.1
1989	Male	16,861.7	3,254.5	20,116.2
	Female	16,213.1	3,616.1	19,829.2
	Total	33,074.8	6,870.6	39,945.4
1990	Male	17,275.1	3,428.4	20,703.5
	Female	16,610.6	3,809.3	20,419.9
	Total	33,885.7	7,237.7	41,123.4

Table 3 (contd.)

Year	Sex	Population		
		Rural	Urban	Total
1991	Male	17,707.8	3,602.2	21,310.0
	Female	17,027.1	3,997.4	21,024.5
	Total	34,734.9	7,599.6	42,334.5
1992	Male	18,148.6	3,782.3	21,648.2
	Female	17,450.9	4,197.3	21,648.2
	Total	35,599.5	7,979.6	43,579.1
1993	Male	18,597.3	3,971.4	22,568.7
	Female	17,882.4	4,407.1	22,289.5
	Total	36,479.7	8,378.5	44,858.2
1994	Male	19,053.8	4,170.0	23,223.8
	Female	18,321.2	4,627.5	22,948.7
	Total	37,375.0	8,797.5	46,172.5
1995	Male	19,518.3	4,378.5	23,896.8
	Female	18,767.2	4,858.8	23,626.7
	Total	38,286.2	9,237.3	47,523.5

The 1985 population was arrived by applying a population growth rate of 2.8 per cent per annum for the 1984 census population, and the sex ratio as obtained from the census is used.

It is worth mentioning that even after adjustment the resulting age-sex structure bears the same inherent distortions, and that the age distribution at older ages is not also reliable.

2. Fertility Assumptions

The following adjusted fertility estimates given in Table 4 were derived from the 1980/81 Demographic Survey, and the 1978 Manpower and Housing Survey, and were taken to represent the base period fertility.

Table 4: Reported and adjusted fertility estimates by rural/urban:
1978-1980.

Residence	Crude birth rate		Total fertility rate	
	Reported	Adjusted	Reported	Adjusted
Rural areas	43.4	46.9	6.8	6.9
Addis Ababa	32.3	37.0	3.8	5.5
Other urban areas	36.7	40.8	4.4	6.0
All urban	35.3	39.6	4.2	5.8
Total	42.6	46.0	6.5	6.78

Table 5: Percentage distribution of reported age specific fertility rates by rural/urban, selected periods.

Period	All Ages	Age Groups						
		15-19	20-24	25-29	30-34	35-39	40-44	45-49
Rural Areas								
1964-1967	100.0	12.9	23.5	23.2	18.1	12.3	5.0	5.0
1968-1971	100.0	14.1	24.8	22.7	16.2	12.9	5.5	3.8
1979/80	100.0	10.5	21.5	23.3	19.0	13.9	8.1	3.7
1980/81	100.0	8.4	20.0	21.9	19.2	16.5	9.2	4.8

Table 5 (contd.)

Period	All Ages	Age Groups						
		15-19	20-24	25-29	30-34	35-39	40-44	45-49
Addis Ababa								
1967	100.0	7.5	24.2	26.8	21.5	13.8	4.3	1.9
1978	100.0	5.8	23.1	25.6	19.4	13.8	6.3	6.0
Other Urban Areas								
1968-1971	100.0	10.2	27.1	23.9	20.3	11.8	4.0	2.7
1978	100.0	7.5	25.0	25.5	17.0	13.5	8.5	3.0
Country								
1977-1981	100.0	9.1	20.9	23.1	19.0	15.1	8.6	4.2

Source: CSO, Study on Levels, Patterns, Trends and Differentials of Fertility, Infant and Childhood Mortality in Ethiopia, pp. 48-50, Addis Ababa, June 1984.

Table 6: Adjusted age-specific fertility rates for total country, rural, urban; 1977-1981.

Age Group	Urban	Rural	Total
15-19	0.0807	0.1288	0.1232
20-24	0.2835	0.2848	0.2840
25-29	0.2960	0.3152	0.3132
30-34	0.2056	0.2636	0.2575
35-39	0.1580	0.2103	0.2048
40-44	0.0909	0.1190	0.1160
45-49	0.0453	0.0587	0.0573
Total	1.16	1.38	1.356
Total fertility rate	5.8	6.9	6.78

The sex ratio at birth of 105 is taken. Three fertility assumptions are taken. The high variant assumes constant fertility. The low and medium fertility assumptions follow the UN models of fertility decline. ^{1/} The replacement level of fertility is assumed to be reached in 60 years from the onset level of gross reproduction rate of 3.3. At present, the coverage of family planning services is very low and only limited to urban areas where it is given as a component of MCH in 365 Government and other health institutions. However, the large population size as revealed by the census, and the general awareness and recognition of population problems such as unbalanced distribution between population and resources, food shortages, famines and droughts are expected to lead to the adoption of population policy and national family planning program. Already large scale resettlement programs are under-going in response to the severe and persistent droughts and famines. The medium and low fertility assumptions are as follows:

- a) Medium fertility assumption, the onset of fertility decline is assumed to start in 1995, total fertility rate is taken as 6.78 for 1985-90, and 1990-95, and 6.7 for 1995-2000.
- b) Low fertility assumption. The onset of fertility decline is assumed to start in 1990. Total fertility rate will be 6.78 for 1985-90, 6.7 for 1990-95, and 6.56 for 1995-2000.

Given the gross reproduction rate, the base period age specific fertility rates given in Table 6 were projected according to the observed shifts in age patterns of fertility overtime. An examination of the pattern of age-specific fertility rates over time (see Table 5) shows of declining trend in the contribution to fertility of women aged 15-19 years, and also of 20-24; and of a shift in the peak of fertility schedule from age group 20-24 to 25-29, and of increasing fertility among rural older women. The fertility of Ethiopian women aged 45-49 is higher than any of the UN models of fertility, and that the Ethiopian age pattern of fertility is different from the UN models for the same level of fertility. ^{2/}

3. Mortality

For the period 1975-1980, the adjusted estimates of the level of mortality were as follows:

<u>Residence</u>	<u>Crude death rate</u>	<u>Expectation of life at birth</u>
Rural	18.4	46.0
Urban	15.7	50.9
Total	18.1	46.5

^{1/} UN, World Population Prospects as Assessed in 1973, op. cit., p. 8-11.

^{2/} UN, World Population Prospects as Assessed in 1973, p. 11, New York, 1977.

The occurrences of persistent droughts and famines have become a common feature for over a decade and climaxed in the 1984/85 drought and famine. The 1984/85 drought, the most serious in the history of the country is believed to have claimed a heavy toll of life. However, due to lack of data, the level of mortality of the 1975-1980 is also assumed to prevail for 1980-85.

Only one mortality assumption of an increase in life expectancy at birth of half a year per year is made here. Levels 13, 14, and 15 of the Coale and Demery North Model life tables were used for the period 1985-1990, 1990-1995, and 1995-2000, respectively with correspondingly expectation of life at birth of 48.3, 50.7, and 53.2 years.

4. Migration

There is no data on external migration and hence no account is taken. Data on internal migration such as place of birth, and length of continuous residence were collected in the census, but is not yet processed. Thus, at present due to lack of migration data, it would be difficult to carry regional and sub-regional population projections.

Despite the lack of migration data, urban-rural population prospection can be made using the UN urban-rural growth difference (URGD) method ^{1/} which requires knowledge of the rural and urban population growth rates. According to calculations I have made on the growth of the urban population over time, the urban population grew by about 5 per cent per annum between 1960's and 1980's, more specifically by 6.6 per cent between 1965 to 1970; 4.26 per cent between 1970 to 1984; and 4.80 per cent between 1965 to 1984. Recent evidences suggest that the urban population growth is slowing down. For the 18 major urban areas covered during the 1978 manpower and housing survey, the growth rate was 5.27 per cent per annum between 1970 to 1978; and 3.5 per cent between 1978 to 1984. The future urban population growth rate would lie between 3.5 to 4.2 per cent per annum, and the rural population growth rate would be between 2.5 to 2.7 per cent per annum. The URGD would be between 1 to 2 per cent, and 1.5 per cent would better approximate the difference. For brevity, the rural/urban population projection is not treated here.

5. Results of Projection

The population size will rise from 43.3 million in 1985 to 49.6 million in 1990; to 57.3 million in 1995, and would reach about 67 million in year 2000. In year 2000 it would reach 67.1 million according to high variant, and 66.5 million according to low variant.

In the 15 years period (1985-2000), the 1985 total population would increase by 54.4 per cent, and children aged 0-14 by 51.8 per cent, that is from 20,043,045 in 1985 to 30,430,612 in 2000 (30,623,704, and 30,011,245 according to high and low variants), and population aged 15-49 by 61.2 per cent from 18,327,404 to 29,548,014 (and from 9,520,170 to 15,016,821 for females). The projected population of 66,950,152 in year 2000 is significantly higher by 22.6 per cent than the previously

^{1/} UN, Manual VIII, Methods for projections of urban and rural population, pp. 36-44, New York, 1974.

projected population of 54,614,300 in year 2000. The projected total population size by sex is presented in Table 7, and the projected population by age-sex groups according to the medium variant is given in Table 8.

Table 7: Population projection by sex 1985-2000.

Year		Male	Female	Both sexes
1985		21,607,429	21,742,511	43,349,940
1990		24,688,920	24,916,463	49,605,383
1995	High	28,527,357	28,808,667	57,336,024
	Medium	28,527,357	28,808,667	57,336,024
	Low	28,442,035	28,725,732	57,167,767
2000	High	33,424,087	33,719,157	67,143,244
	Medium	33,326,070	33,624,082	66,950,152
	Low	33,113,473	33,417,312	66,530,785

The projection results show that the implied rate of population growth would continue to be very rapid, growing from 2.7 per cent per annum for 1985-1990, to 2.9 per cent for 1990-95, and to 3.1 per cent for 1995-2000. For 1995-2000 it would be 3 per cent according to the low variant, and 3.2 per cent according to the high variant.

IV. Conclusion

The population estimates and projections of the country which were based on the data from the National Sample Survey, second round, 1968-1971, and which was in use up to last year were found to be too low compared with the result of the first population and housing census of May 1984. Hence, the ten year perspective plan need to be revised in the light of the census results.

The paper traced the population projections in use up to now, the need for demographic data in planning, and on the basis of the 1984 census results a population projection was prepared for the period from 1985-2000. The new population projection results show that the country which had already a large population in 1985, 43.3 million would still have a much larger population of 67 million by year 2000.

This very large population would have obvious serious consequences on the socio-economic development of the country although the implications are not treated here for lack of detailed data and brevity.

From the experiences gathered from the population data requirements of the ten year perspective plan and the preceding six series of annual development plans

Table 8: Population projection by age-sex group, medium variant, 1985-2000.

Age Group	1985		1990		1995		2000	
	Male	Female	Male	Female	Male	Female	Male	Female
0-4	3,860,695	3,800,669	4,513,632	4,395,619	5,289,403	5,141,417	6,293,765	6,104,865
5-9	3,473,699	3,440,862	3,570,371	3,529,985	4,218,937	4,127,794	4,992,139	4,876,686
10-14	2,800,446	2,666,674	3,370,843	3,341,937	3,477,256	3,442,406	4,122,914	4,040,243
15-19	2,012,579	1,888,152	2,737,268	2,609,607	3,302,010	3,278,774	3,413,483	3,385,469
20-24	1,486,483	1,557,569	1,952,972	1,842,043	2,662,404	2,552,509	3,219,691	3,215,035
25-29	1,270,409	1,550,234	1,433,059	1,610,295	1,888,602	1,794,739	2,582,452	2,493,929
30-34	1,177,134	1,421,158	1,222,133	1,499,293	1,383,117	1,562,662	1,828,658	1,747,322
35-39	1,107,748	1,228,795	1,128,059	1,367,651	1,175,374	1,448,467	1,334,889	1,515,345
40-44	959,852	1,003,475	1,053,989	1,176,289	1,077,736	1,314,559	1,127,513	1,397,771
45-49	792,629	780,787	903,502	955,659	997,253	1,124,744	1,024,507	1,261,950
50-54	660,429	600,479	734,973	736,633	842,563	905,363	934,466	1,069,980
55-59	571,258	484,287	598,385	556,272	670,244	685,842	773,144	847,202
60-64	478,148	414,212	499,297	434,434	527,040	502,386	594,942	623,629
65-69	379,421	307,757	393,927	351,355	414,926	371,932	442,382	434,147
70+	575,729	507,401	576,110	509,391	600,492	555,073	641,125	610,509
Total	21,607,429	21,742,511	24,688,920	24,916,463	28,527,357	28,808,667	33,326,070	33,624,082

and campaigns as well as from other data users, we should, in future, prepare comprehensive and elaborate population projections so as to facilitate effective integration of population factors into development planning. Thus population projections should embrace projections by age-sex group for total country, rural/urban, regional and subregional at least up to the awraja (province) level, projection of population of cities etc. It should also include sectoral population projections such as labour force, school age population, and projections of housing and households. That the preparation of annual estimates of population and other projected variables should form an integral part of the projections. Last but not least, with the co-operation of planners, the quantitative implications of the population projections for food, housing, health, education, employment, consumption, investment, etc. should be incorporated so as to clearly show the need for population policy and long term population planning. The need for formulating an appropriate population policy is clearly recognized in the ten year perspective plan. In view of the currently high fertility and very large population, the timely adoption and institution of population policy and national family planning program will serve the long term interests of the society.